MAGIC MILK EXPERIMENT

NAME

CLASS / DATE

01 QUESTION

How does milk fat percentage relate to the duration and visible intensity of color motion after a measured soap touch?

02 PREDICT BEFORE YOU MEASURE

I PREDICT THE MOST VISIBLE MOVEMENT IN…

○ whole milk ○ 2% milk ○ skim milk ○ no clear winner

Any choice can be tested. Do not treat fat content as a guaranteed swirl ranking.

03 VARIABLES

I CHANGE (INDEPENDENT)

I MEASURE (DEPENDENT)

I KEEP THE SAME (CONTROLLED) · NAME THE MILK TYPE CHANGED AND WHAT STAYED THE SAME.

04 MATERIALS

- ☐ 10 identical shallow plates (9 tests + 1 whole-milk control)
- ☐ Whole, 2% and skim milk (60 mL per plate)
- ☐ 3 food colors (1 drop each per plate)
- ☐ 10 fresh cotton swabs
- ☐ Dish soap (1 measured drop per test), timer and dropper
- ☐ Eye protection for each student
- ☐ Paper towels and spill tray

05 PROCEDURE

SAFETY Check for dairy or food-coloring allergies before setup. Do not drink or eat the milk after soap or test materials have touched it. Wear eye protection. Use only one small drop of dish soap per test swab, keep it away from eyes, and wipe milk spills promptly to prevent a slippery surface.

1 **LABEL TEN MATCHED PLATES** Prepare three fresh plates each for whole, 2% and skim milk, plus one extra whole-milk plate as a no-soap control. Pour 60 mL into every plate. ☐

2 **PLACE THE COLORS** Add one drop each of the same three food colors at marked positions. Let every plate sit undisturbed for the same short wait. ☐

3 **OBSERVE THE CONTROL** Touch the separate whole-milk control with a clean dry swab. Note any movement before soap. ☐

4 **RUN NINE FRESH SOAP TRIALS** Use one drop of soap on a new swab for each test plate. Touch the center once and time from contact; do not stir or reuse a swab. ☐

5 **TIME, RATE AND COMPARE** Stop after five seconds without visible motion, or record 60+ seconds at the one-minute cap. Keep all three times and scores per milk, then calculate mean and range. ☐

DATA AND EXPLANATION

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06 RECORD YOUR OBSERVATIONS

MILK TYPE	TRIAL TIMES (S)	PATTERN SCORES (1-5)	MEAN TIME / RANGE
Whole			
2%			
Skim			

Write three results in each trial cell. Stop the timer after five seconds without visible motion; record 60+ s if still moving at 60 s. Scores: 1 none · 2 short/local · 3 about 1/3 plate · 4 about 2/3 · 5 most. Mean = total ÷ 3; range = highest − lowest.

07 DRAW ONE COLOR PATTERN

Sketch the plate you tested. Label the soap touch point, the food-coloring paths and the milk type; add an arrow to show motion.

08 EXPLAIN IT WITH EVIDENCE

CLAIM

EVIDENCE

REASONING

Reasoning must use: milk type · soap · surface · fluid motion · tracer

09 THINK FURTHER

How would you change the test to compare two soap amounts while keeping milk type, depth and color placement the same?